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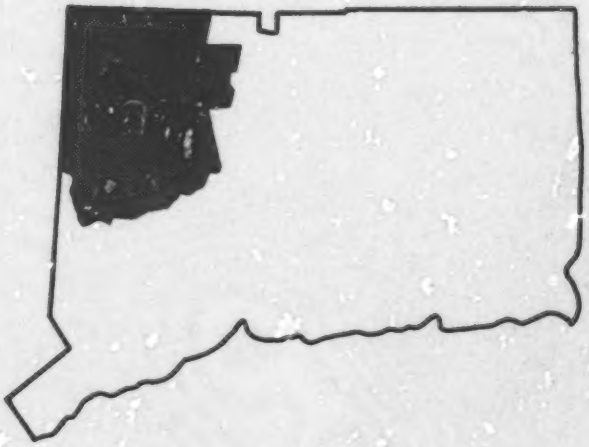
FLOOD INSURANCE STUDY

TOWN OF CORNWALL, CONNECTICUT
LITCHFIELD COUNTY



AUGUST 16, 1988

COMPLETED

Federal Emergency Management Agency

COMMUNITY NUMBER - 090045

ORIGINAL

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance study purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
TOWN OF CORNWALL, LITCHFIELD COUNTY, CONNECTICUT

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Cornwall, Litchfield County, Connecticut, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the New England Division of the U. S. Army Corps of Engineers (COE) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-E-0941. This work was completed in December 1985.

1.3 Coordination

On August 2, 1983, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the town, and the New England Division of the COE (the study contractor) to explain the nature and purpose of the study, to review the scope and limits of work, and to obtain flood information currently available concerning the community. The Town Clerk was contacted to obtain information pertinent to this study. On October 9, 1987, a final CCO meeting was held with representatives of FEMA, the town, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Cornwall, Litchfield County, Connecticut. The area of study is shown on the Vicinity Map (Figure 1).

The following streams were studied by detailed methods: the Housatonic River, for its entire length within the community; and the Hollenbeck River, from the corporate limits to State Route 43. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through December 1990.

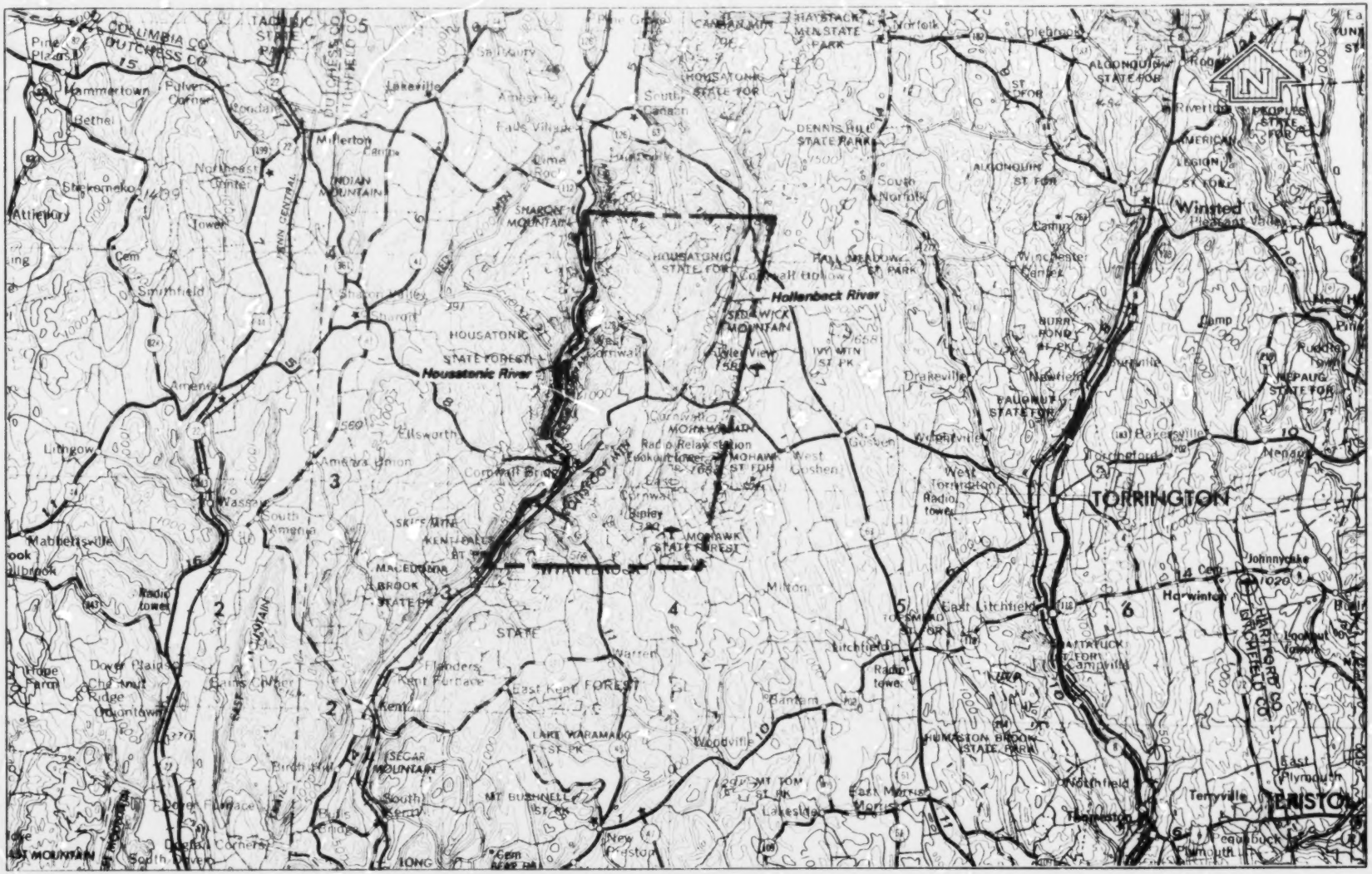
The following flooding sources were studied by approximate methods: the West Branch Shepaug River, Furnace Brook, Baldwin Brook, Valley Brook, Birdseye Brook, Mill Brook, Tanner Brook, Cream Hill Lake, and the remaining portions of the Hollenbeck River. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Town of Cornwall.

2.2 Community Description

The Town of Cornwall is located in the west-central section of Litchfield County in northwestern Connecticut. It is bordered by the Town of Canaan to the north, the Town of Salisbury to the northwest, the Town of Goshen to the east, the Towns of Warren and Kent to the south, and the Town of Sharon to the west. The Housatonic River also borders to the west.

The total land area within the Town of Cornwall is 46.8 square miles. The population in 1980 was 1,288 with a population density of 28 persons per square mile, an increase of 9.4 percent over the 1970 population (Reference 1). The population is projected to grow only 1.7 percent between the years 1980 and 1990.

Cornwall is basically a rural community, and almost one-fifth of its residents are senior citizens. There are no large commercial or industrial centers, so many of those in the labor force work outside the community. Villages such as West Cornwall and Cornwall Bridge are predominantly residential. There is a private school in the town, but the public high school is regionalized. The major industries, by employment, are professional, trade, and service businesses. Approximately 15 percent of the labor force is employed in manufacturing. Future residential, commercial, and industrial developments depend on the rates of development of influencing communities to the south, the general aging of the population, and influx of new residents to the community.


Housatonic River
Hollenbeck River
TORRINGTON
Winsted
Harwinton
Litchfield
Milton
Kent
Norfolk
Lakeville
Falls Village
Canaan
Sharon
Cornwall
Goshen
Torrington
Winchester
Colebrook
Barkhamsted
Riverton
Pleasant Valley
Thomaston
Terryville
Plymouth
Bristol
Harwinton
Burlington
Avon
Simsbury
Granby
Canton
Barkhamsted
New Hartford
Winchester
Colebrook
Norfolk
Goshen
Cornwall
Sharon
Salisbury
Kent
Warren
Litchfield
Harwinton
Torrington
Winsted
Barkhamsted
New Hartford
Canton
Simsbury
Avon
Burlington
Bristol
Plymouth
Thomaston
Watertown
Morris
Bantam
Woodville
Milton
Cornwall Bridge
West Cornwall
West Torrington
East Litchfield
Northfield
Lakeside
Pequabuck
Terryville
East Plymouth
Johnnycake
Nepaug
Rugged
Camp
Cem
Radio tower
Radio Relay station
Lookout tower
Ski area
Ski trail
Golf course
Airport
Campsite
Picnic area
Boat launch
Fishing access
Swimming area
Trail
Scenic road
Historic site
Museum
Visitor center
Ranger station
Fire tower
Observation tower
Lighthouse
Monument
Memorial
Cemetery
Church
School
Hospital
Library
Post office
Town hall
Courthouse
Jail
Police station
Fire station
Water tower
Windmill
Dam
Bridge
Tunnel
Ford
Ferry
Pier
Wharf
Boat ramp
Marina
Beach
Swimming pool
Golf course
Tennis court
Basketball court
Baseball field
Football field
Soccer field
Track
Stadium
Arena
Gymnasium
Auditorium
Theater
Restaurant
Hotel
Motel
Campground
Picnic area
Parking area
Gas station
Repair shop
Store
Supermarket
Shopping center
Bank
Office building
Factory
Warehouse
Power plant
Substation
Transmission line
Pipeline
Railroad
Railroad station
Railroad yard
Railroad bridge
Railroad tunnel
Railroad crossing
Railroad signal
Railroad switch
Railroad turntable
Railroad roundhouse
Railroad water tower
Railroad coaling station
Railroad sand house
Railroad section house
Railroad tool house
Railroad bunkhouse
Railroad mess hall
Railroad commissary
Railroad hospital
Railroad dispensary
Railroad chapel
Railroad YMCA
Railroad YWCA
Railroad Red Cross
Railroad USO
Railroad Salvation Army
Railroad Boy Scouts
Railroad Girl Scouts
Railroad 4-H
Railroad Future Farmers of America
Railroad Future Homemakers of America
Railroad Future Business Leaders of America
Railroad Future Teachers of America
Railroad Future Nurses of America
Railroad Future Doctors of America
Railroad Future Lawyers of America
Railroad Future Engineers of America
Railroad Future Scientists of America
Railroad Future Astronauts of America
Railroad Future Presidents of America
Railroad Future Vice Presidents of America
Railroad Future Secretaries of America
Railroad Future Treasurers of America
Railroad Future Attorneys General of America
Railroad Future Postmasters General of America
Railroad Future Secretaries of Agriculture of America
Railroad Future Secretaries of Commerce of America
Railroad Future Secretaries of Labor of America
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Railroad Future Secretaries of the Secretary of the Secretary of the Secretary of the Treasury of America
Railroad Future Secretaries of the Secretary of the Secretary of the Secretary of the Attorney General of America
Railroad Future Secretaries of the Secretary of the Secretary of the Secretary of the Postmaster General of America

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CORNWALL, CT

(LITCHFIELD CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

The climate of Cornwall is variable, typical of the northwestern region of Connecticut. It experiences frequent periods of heavy precipitation produced by local thunderstorms and large weather systems of tropical origin. The mean annual precipitation is approximately 49 inches, with an average annual snowfall of approximately 80 inches. Distribution of precipitation is fairly uniform over the year. The average annual temperature in Cornwall is approximately 47 degrees Fahrenheit (^{o}F). Summers tend to be short and warm with brief periods of hot, humid weather. Temperatures during this period average approximately 69^{o}F. Average winter temperatures of 26^{o}F are characteristic of the cold winters. Freezing temperatures may be expected from the end of October to the end of April.

Located in the foothills of the Berkshires, the topography of the region is variable. Glacially-formed mountains and hills tend to be narrow and flat-topped with moderate relief, rising to elevations of 1,200 to 1,500 feet. Valleys are generally well developed and well graded with a few poorly drained lakes and swampy areas. Portions of the Housatonic State Forest cross the north and west boundaries, and a large section of the Mohawk State Forest is found in the southeast corner of town. Floodplains may be narrow and steep in locations along the Housatonic River. Bedrock in the region consists primarily of gneiss, schist, and marble. Glacially influenced hard pan soils are found throughout the region, with scattered deposits of sand and gravel found along the rivers.

2.3 Principal Flood Problems

The Town of Cornwall is subject to flooding from the Housatonic River, Hollenbeck River, and several brooks and tributaries in the area. The Housatonic River is formed by the convergence of the East and West Branches in Pittsfield, Massachusetts, and flows in a southern direction through the community, forming the boundary between the Towns of Canaan and Sharon. The relief of the river diminishes as the river flows south through the mid-section of the basin. The natural valley storage upstream of Cornwall results in moderate main stem runoff in that region and, subsequently, flooding in the community is largely produced by this drainage area. Elevations in this area usually vary between 500 to 1,500 feet.

Floods may occur in the basin at any time of year since it is susceptible to flooding caused by ice, heavy rainfall, melting snow, or combinations of these. Floods in late summer and fall are usually due to hurricanes or other coastal storms, while winter floods are frequently due to thaws in years of heavy snowfall.

Information on flooding prior to 1900 is sparse, but significant incidences during this time seem to have occurred in 1869, 1888, and 1897. Since 1900, major flooding events in the Housatonic basin happened in 1927, 1936, 1938, 1949, and 1955.

November 1927 brought heavy rains from a tropical storm originating in the Caribbean and traveled through western Connecticut, Massachusetts, and Vermont. Although the worst impact was on Vermont, the storm dropped approximately 5 inches or more of rain in the area.

A combination of warm thawing temperatures, heavy snow cover, and two heavy rainstorms in close succession in March 1936 caused high runoff measurements and flooding of the Housatonic River basin.

Heavy rain in association with a tropical hurricane and stationary cold front along the coast was responsible for the flood of September 1938. Over a 4-day period, the rainfall increased in intensity with a total average of 9 inches.

The current flood of record for the basin above Kent is the New Year's Flood of 1949, which was typical of winter cyclonic events of continental origin. Snowmelt was a minor factor as the average rainfall of approximately 8 inches fell on partially frozen ground, increasing the amount of runoff. Canaan was considered a major damage center, as well as Lee, Pittsfield, and Stockbridge, Massachusetts. The flood of record below Kent occurred in August 1955 when Hurricane Diane's precipitation fell upon ground previously saturated by Hurricane Connie. This was followed in October of the same year by an extratropical storm south of the New England coastline.

Two gaging stations that provided data of interest to this study are shown in the following tabulation (References 2 and 3):

Location	Drainage Area (square miles)	Date	Peak Discharge (cfs)
Housatonic River near Great Barrington	280	January 1949	12,200
		September 1938	11,520
		March 1936	8,990
		November 1927	7,910
		August 1955	6,060
Housatonic River at Falls Village	630	January 1949	23,900
		August 1955	22,700
		September 1938	19,900
		March 1936	14,500
		November 1927	11,700
		October 1955	8,940

A stream gaging station was established on Furnace Brook at Cornwall Bridge for a limited period. The maximum flow of record at this station was the August 1955 flood with a flow of 4,060 cfs.

2.4 Flood Protection Measures

The Town of Cornwall joined the National Flood Insurance Program in July 1977 and, as such, has incorporated a set of floodplain management regulations to help minimize future flood damages and related hazards into its zoning laws.

Cornwall is a member of the Housatonic River District Commission, composed of neighboring towns in an effort to protect the Housatonic River Corridor and its natural resources by uniform standard regulation. These standards incorporate flood control measures by discouraging floodplain development in accordance with existing regulations. The Commission has met with State and Federal organizations to discuss their activities and is also a member of the American Rivers Conservation Council.

All Federal flood control works constructed in the basin are found in the Naugatuck sub-basin, which has no effect on flooding in Cornwall.

The Weather Service branch of the National Oceanic and Atmospheric Administration (NOAA) has the responsibility for issuing flood warnings and forecasting river stages in the Housatonic River basin, including all tributaries to the main stem.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

Discharges for the 10-, 50-, 100-, and 500-year floods on the Housatonic River were developed by statistical analysis of recorded flow data in the region. Two U. S. Geological Survey (USGS) gaging stations on the Housatonic River were used in the analysis: one is located at Falls Village (gage No. 01199000) within the Town of Canaan, with a drainage area of 634 square miles and 71 years of record; and the other is located at Gaylordsville (gage No. 01200500) with a drainage area of 996 square miles and 70 years of record. Statistical analyses at both gaging stations were performed by using a log-Pearson Type III distribution with a regional skew coefficient of 0.6 (Reference 4). Discharge frequencies at locations downstream of the Falls Village gage, through Cornwall, were developed by linearly interpolating between those at Falls Village and those at Gaylordsville. However, at the Cornwall-Kent corporate limits, discharge frequency information from the Flood Insurance Study for the Town of Kent was adopted as the starting discharges (Reference 5).

Discharge frequency information for the Hollenbeck River was developed by statistical analysis of available flow data in the region. Since there are no stream-flow gaging stations on the Hollenbeck River, records at the following gages were used for comparative analysis: the nearby Blackberry River gage at Canaan (gage No. 01198500) with a drainage area of 45.9 square miles and 32 years of record; and the Salmon Creek gage at Lime Rock in the Town of Salisbury (gage No. 01199050) with a drainage area of 29.4 square miles and 40 years of record. Statistical analyses at both gaging stations were performed by using a log-Pearson Type III distribution (Reference 4). The final adopted discharge frequencies, considered to be more characteristically representative of the Hollenbeck River, were developed from the Salmon Creek gage record. Discharge frequencies at locations along the Hollenbeck River were considered proportional to those at the Salmon Creek gage by ratio of respective drainage area to the 0.7 exponential power.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
HOUSATONIC RIVER					
At Cornwall-Kent corporate limits	738	17,730	30,390	37,900	61,270
Above Cornwall Bridge	705	13,900	22,100	26,000	38,000

TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
HOUSATONIC RIVER (continued)					
At Cornwall-Canaan corporate limits	676	13,100	20,600	24,600	36,000
HOLLENBECK RIVER					
At Cornwall-Canaan corporate limits	9.6	640	1,330	1,770	3,250
At State Route 43	5.1	400	860	1,140	2,100

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analyses of the Housatonic River and the Hollenbeck River were obtained from aerial photographs at a scale of 1:12,000 with a contour interval 5 feet (Reference 6). The below water-sections were obtained by field measurements, the use of topographic maps, and engineering judgment. All bridges, culverts, and dams were surveyed to obtain elevation data and structural geometry in order to compute the significant backwater effects of these structures.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 7). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the Housatonic River were taken from a stage discharge relationship developed for the Flood Insurance Study for the Town of Kent (Reference 5). The starting water-surface elevations for the Hollenbeck River were taken from a stage discharge relationship developed from flood profiles for the Flood Insurance Study for the Town of Canaan (Reference 8).

Roughness factors (Manning's "n") used in the hydraulic computations were determined on the basis of field inspection, analysis of photographs, and engineering judgment. Channel "n" values for the Housatonic River ranged from 0.035 to 0.045, and the overbank "n" values ranged from 0.075 to 0.130. Channel "n" values for the Hollenbeck River ranged from 0.030 to 0.035, and the overbank "n" value was 0.070.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:4,800 with a contour interval of 5 feet (Reference 9).

For the flooding sources studied by approximate methods, the 100-year flood boundaries were delineated using the Flood Hazard Boundary Map for the Town of Cornwall (Reference 10).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries

are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 2).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 2). The computed floodways are shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodway widths for the Housatonic River extend beyond the corporate limits.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Housatonic River								
A	62.50[1]	249[3]	3,302	11.5	402.3	402.3	403.3	1.0
B	62.84[1]	245[3]	3,139	12.1	407.9	407.9	408.0	0.1
C	63.90[1]	420[3]	5,675	6.7	414.8	414.8	415.6	0.8
D	64.30[1]	365[3]	5,704	6.6	416.5	416.5	417.4	0.9
E	65.13[1]	326[3]	5,257	7.2	426.3	426.3	426.6	0.3
F	66.20[1]	208[3]	3,522	7.4	442.2	442.2	443.1	0.9
G	67.45[1]	346[3]	2,686	9.7	450.6	450.6	450.9	0.3
H	68.33[1]	256[3]	2,632	9.9	474.2	474.2	474.3	0.1
I	69.25[1]	194[3]	2,847	9.1	493.7	493.7	493.7	0.0
J	70.23[1]	238[3]	3,167	8.2	504.3	504.3	504.4	0.1
K	70.87[1]	311[3]	4,141	6.3	515.4	515.4	515.7	0.3
L	71.68[1]	212[3]	2,773	9.4	523.1	523.1	523.5	0.4
M	72.56[1]	230[3]	3,344	7.8	533.4	533.4	533.5	0.1
Hollenback River								
A	57,850[2]	81	369	4.8	838.9	838.9	839.9	1.0
B	60,530[2]	35	151	11.7	851.9	851.9	851.9	0.0
C	61,990[2]	82	278	6.4	864.3	864.3	864.3	0.0
D	63,610[2]	236	623	2.8	867.4	867.4	868.0	0.6
E	67,530[2]	83	199	8.9	890.1	890.1	890.1	0.0
F	70,178[2]	24	153	7.5	915.8	915.8	916.4	0.6
G	74,478[2]	202	1,286	0.9	923.5	923.5	924.2	0.7

[1]Miles above mouth
[2]Feet above confluence with Housatonic River
[3]This width extends beyond corporate limits

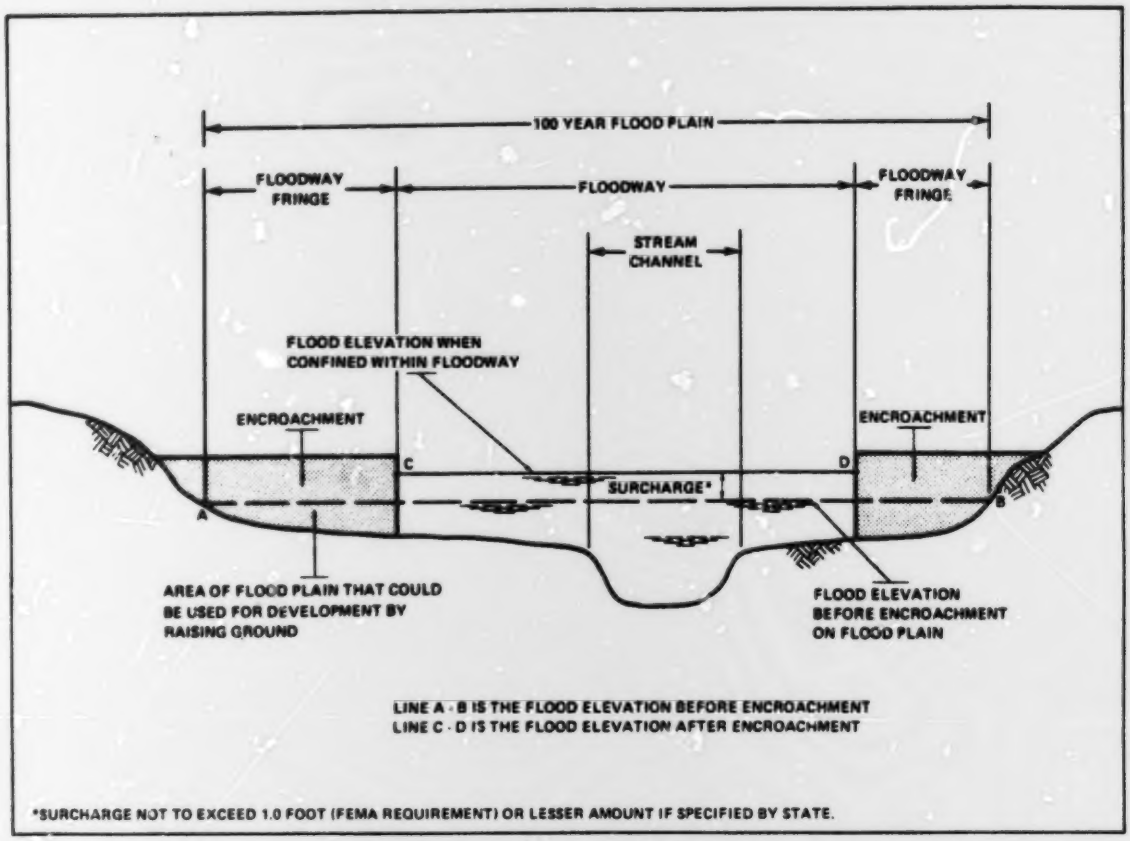
TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CORNWALL, CT
(LITCHFIELD CO.)

FLOODWAY DATA

HOUSATONIC RIVER - HOLLENBECK RIVER


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 2

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

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Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain,and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

Flood Insurance Studies are currently being prepared for the Towns of Canaan, Sharon, and Salisbury (References 8, 11, and 12). The results of those studies will be in exact agreement with the results of this study.

Due to its more detailed nature, this study supersedes the Flood Hazard Boundary Map for the Town of Cornwall (Reference 10).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, J. W. McCormack Post Office and Courthouse Building, Room 462, Boston, Massachusetts 02109.

9.0 BIBLIOGRAPHY AND REFERENCES

1. U. S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Connecticut, Washington, D. C., U. S. Government Printing Office, 1981.

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4. U. S. Department of the Interior, Geological Survey, Office of Water Data Collection, Interagency Advisory Committee on Water Data, "Guidelines for Determining Flood Flow Frequency," Bulletin 17B, Reston, Virginia, Revised September 1981.

5. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Kent, Litchfield County, Connecticut, Washington, D. C., March 4, 1980.

6. U. S. Army Corps of Engineers, New England Division, Aerial Photographs, Scale 1:12,000: Cornwall, Connecticut, 1984.

7. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, September 1982.

8. Federal Emergency Management Agency, Flood Insurance Study, Town of Canaan, Litchfield County, Connecticut (Unpublished).

9. U. S. Army Corps of Engineers, New England Division, Topographic Maps, Scale 1:4,800, Contour Interval 5 Feet: Cornwall, Connecticut, 1984.

10. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Town of Cornwall, Litchfield County, Connecticut, January 9, 1976.

11. Federal Emergency Management Agency, Flood Insurance Study, Town of Sharon, Litchfield County, Connecticut (Unpublished).

12. Federal Emergency Management Agency, Flood Insurance Study, Town of Salisbury, Litchfield County, Connecticut (Unpublished).

U. S. Department of the Interior, Geological Survey, Flood Flow Formulas for Connecticut-Interim Flood Management Worksheet No. 6, October 1977.

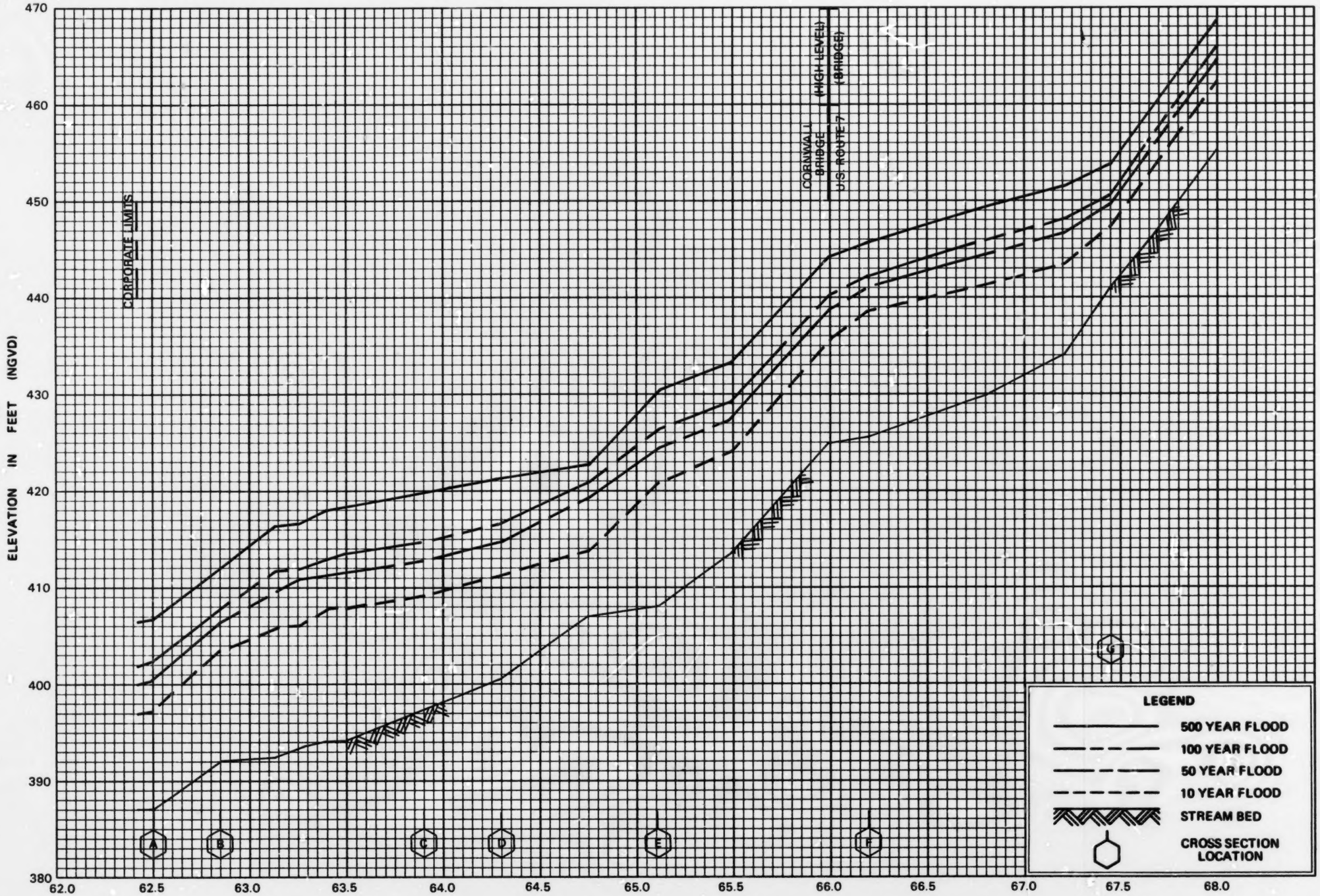
U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 Feet: Cornwall, Connecticut, 1976; Ellsworth, Connecticut, 1976; South Canaan, Connecticut, 1969.

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 1	02	638.29	PK nail on west edge of U. S. Route 7 in Sharon, Connecticut, approximately 0.3 mile south of corporate limits on U. S. Route 7, opposite HEL Co pole No. 992.
RM 2	02	601.94	PK nail on east side of U. S. Route 7 in Sharon, Connecticut, approximately 1.1 miles south of Sharon corporate limits.
RM 3	04	627.46	PK nail on east edge of U. S. Route 7 in Sharon, Connecticut, approximately 640 feet north along U. S. Route 7 from its intersection with Pine Swamp Road.
RM 4	04	563.75	PK nail on west edge of U. S. Route 7 in Sharon, Connecticut, approximately 0.6 mile south along U. S. Route 7 from its intersection with Pine Swamp Road.
RM 5	04	532.94	PK nail at centerline of intersection of State Route 128 and Boston and Maine railroad tracks.
RM 6	07	849.87	PK nail on west edge of State Route 63 at centerline of State Route 43.
RM 7	07	925.10	USC&GS Disk No. 3074, on west side of State Route 43, approximately 120 feet south of its intersection with Ford Hill Road.
RM 8	09	932.22	PK nail on west edge of State Route 43, approximately 0.6 mile south of its intersection with Lake Hill Road, northeast of SNET pole No. 2311.
RM 9	12	513.25	PK nail on west edge of U. S. Route 7 in Sharon, Connecticut, approximately 0.6 mile north along U. S. Route 7 from its intersection with Smith Hill Road.
RM 10	12	500.72	PK nail in centerline of U. S. Route 7 in Sharon, Connecticut, approximately 0.6 mile south along U. S. Route 7 from its intersection with Smith Hill Road.

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 11	14	480.45	PK nail in centerline of driveway on north side of State Route 4, east of intersection of State Route 4 and U. S. Route 7.
RM 12	22	568.70	PK nail on east side of U. S. Route 7 at intersection of U. S. Route 7 and State Route 45, east of CL&P Pole No. A3589.
RM 13	22	518.93	PK nail on west edge of U. S. Route 7, north of intersection of U. S. Route 7 and Whitcomb Hill Road, east of log building.
RM 14	24	512.24	PK nail on west edge of U. S. Route 7, approximately 0.4 mile north of Cornwall corporate limits on U. S. Route 7 at centerline of driveway.



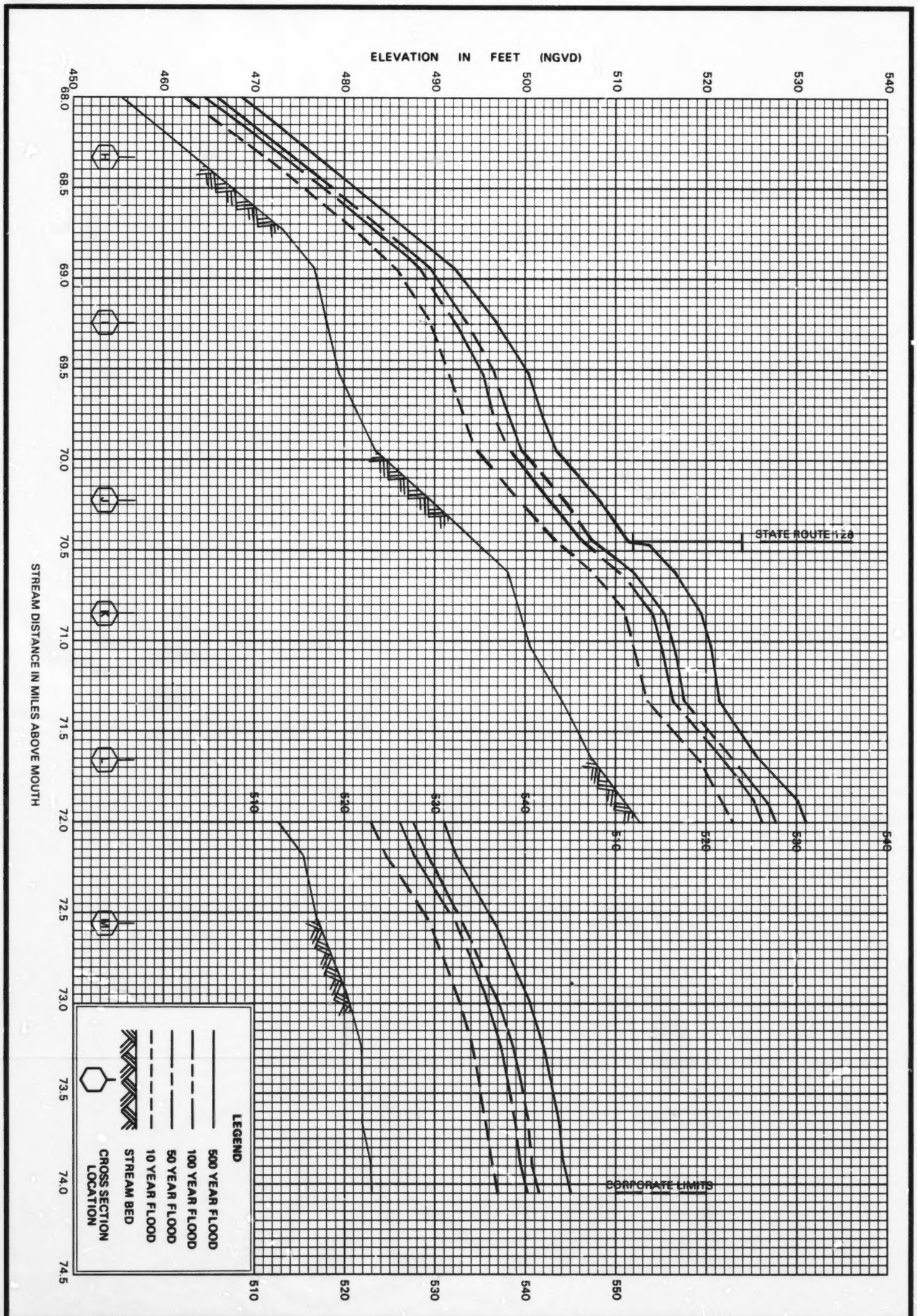
FLOOD PROFILES

HOUSATONIC RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CORNWALL, CT
(LITCHFIELD CO.)

01P



FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CORNWALL, CT
(LITCHFIELD CO.)

02P

FLOOD PROFILES

HOUSATONIC RIVER

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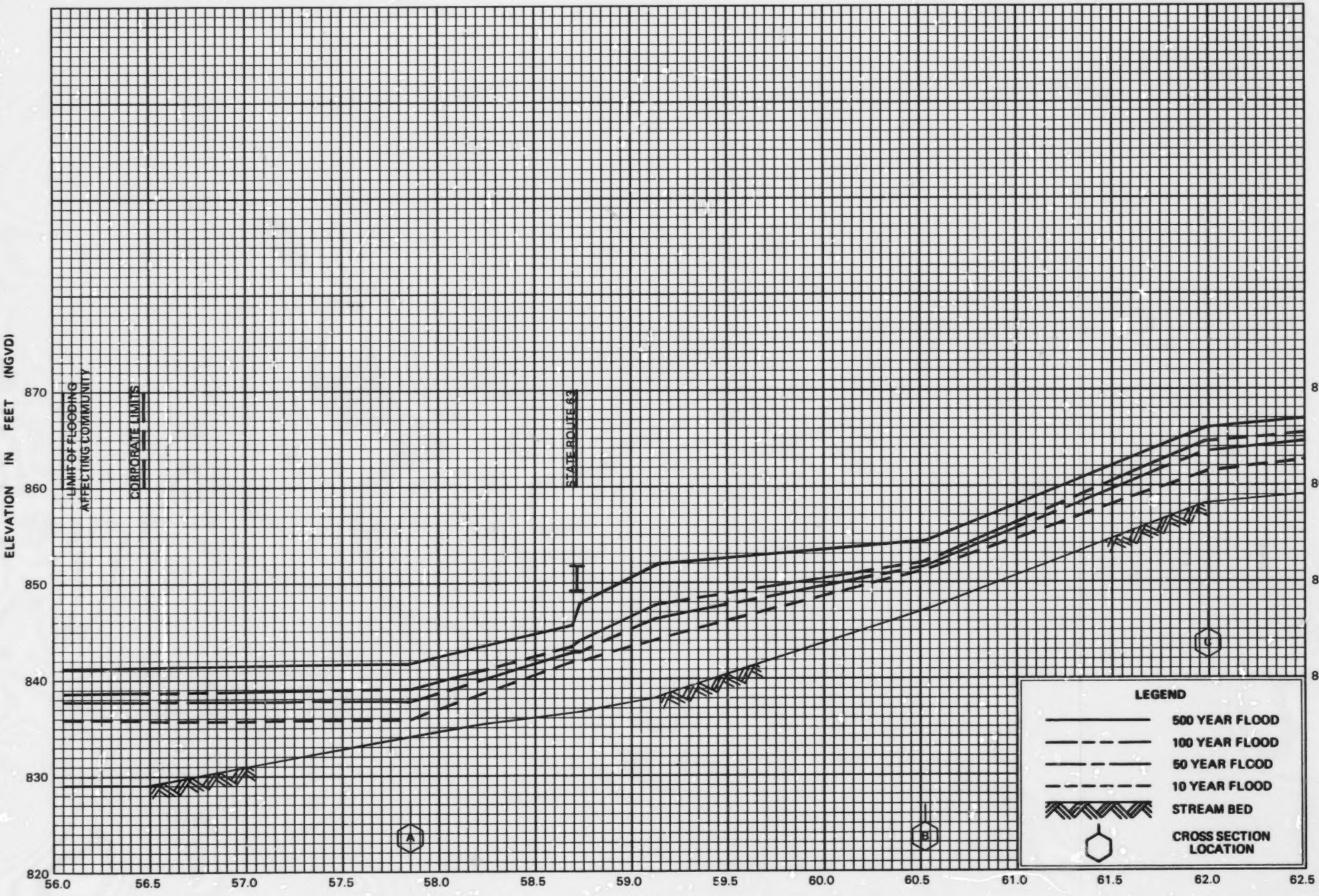


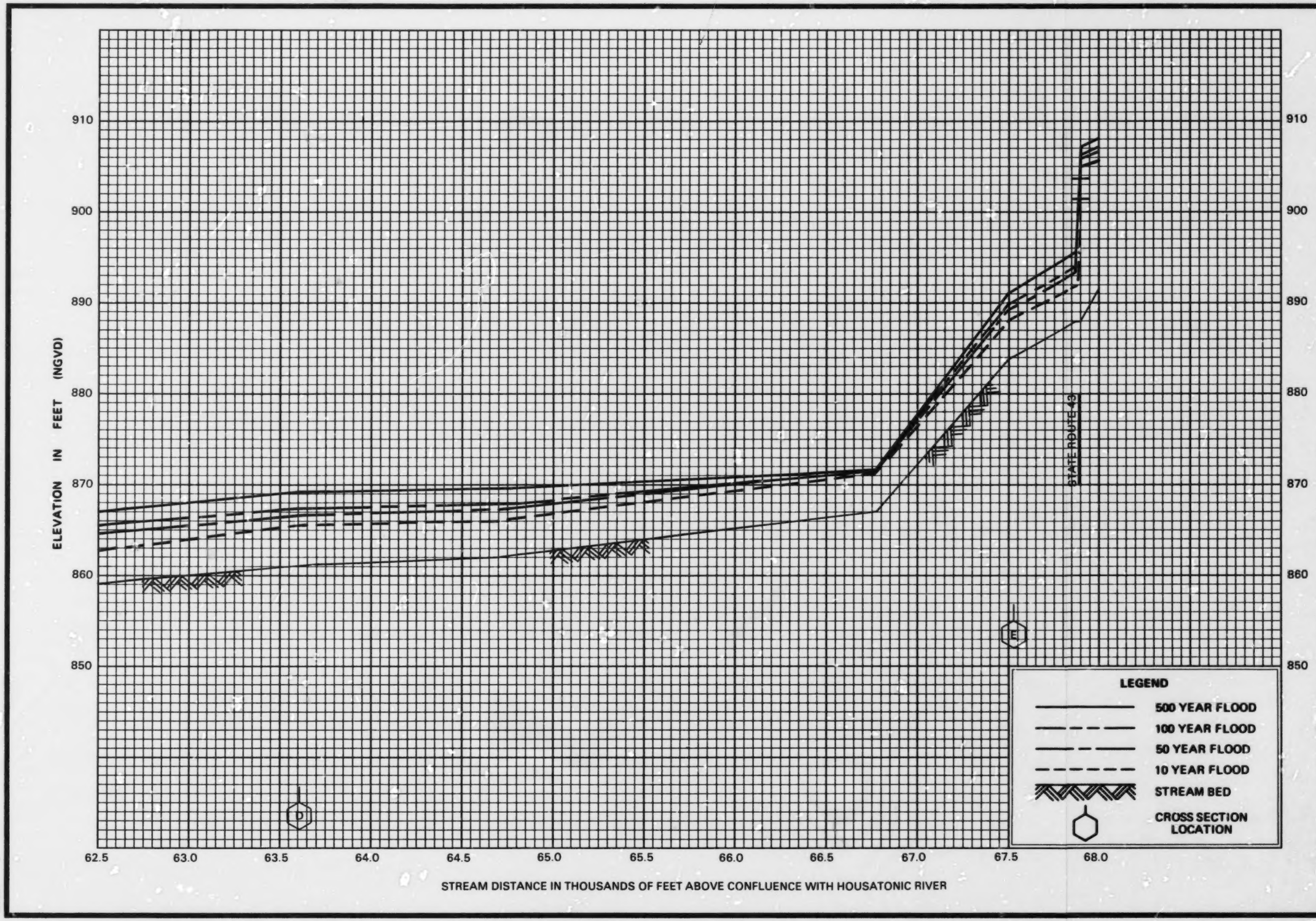
FLOOD PROFILES

HOLLENBECK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CORNWALL, CT
(LITCHFIELD CO.)

03P



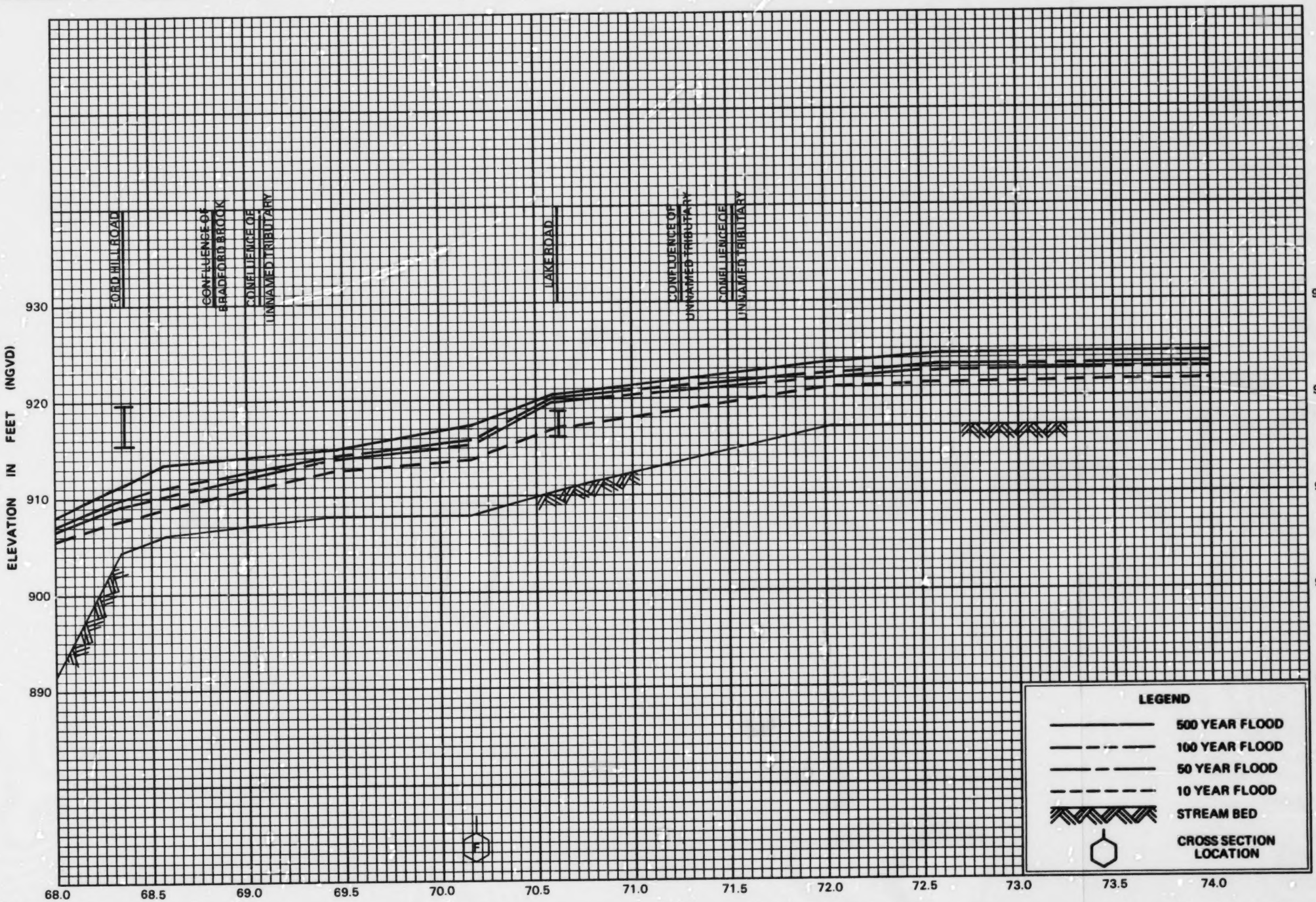
FLOOD PROFILES

HOLLENBECK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CORNWALL, CT
(LITCHFIELD CO.)

04P



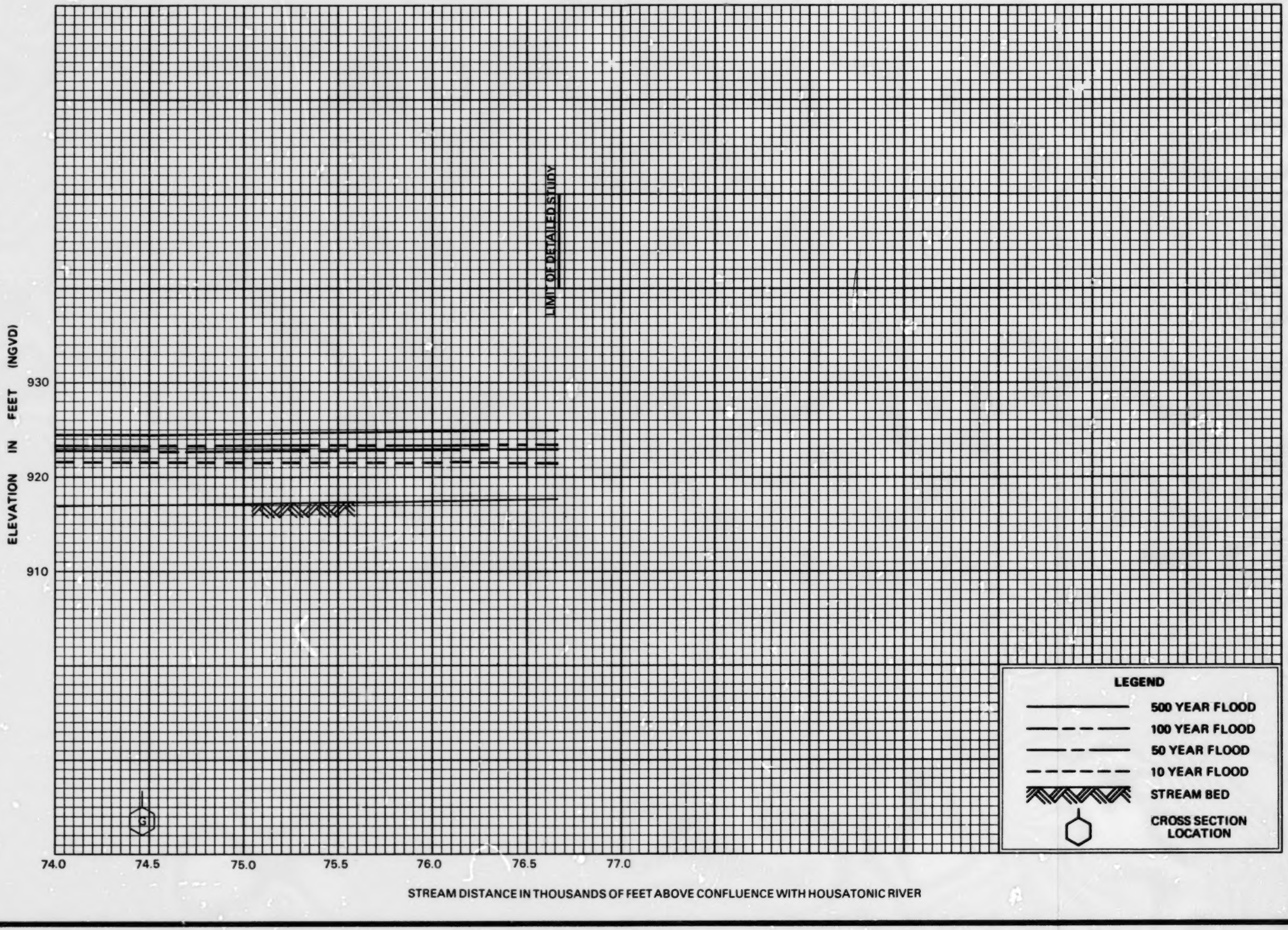
FLOOD PROFILES

HOLLENBECK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CORNWALL, CT
(LITCHFIELD CO.)

05P



FLOOD PROFILES

HOLLENBECK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CORNWALL, CT
(LITCHFIELD CO.)

06P